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# USSR Report

TRANSPORTATION

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# USSR REPORT TRANSPORTATION

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## CIVIL AVIATION

### OFFICIAL ON DEVELOPMENT OF AIRCRAFT FOR ARCTIC OPERATIONS

Moscow TEKHNIKA I VOORUZHENIYE in Russian No 8, Aug 86 pp 2-3

[Article by V. Trigoni, deputy chief of the Scientific and Technical Main Administration, Ministry of Civil Aviation, under the rubric "With the Routes of the Five-Year Plan": "Polar Aviation"]

[Text] Ensure that civil aviation is equipped with aircraft for use under conditions in the Arctic and Antarctic... (From the Basic Directions for Economic and Social Development of the USSR for 1986-1990 and the period up to the year 2000)

Ice reconnaissance of the northern sea routes, support for Arctic and Antarctic expeditions and fishing flotillas, supplying new construction projects and oil and gas enterprises in our country's northern regions with the most diverse cargoes, transporting people--polar aviation has been called upon to carry out these and many other tasks. The complexity of these tasks is caused chiefly by the extremely severe conditions in the North. The aircraft of polar aviation have to fly over terrain which does not have clearly defined reference points, as a rule, and they cannot always resort to the assistance of short-range and long-range navigation radiobeacons, either. They often have to make a landing on dirt and snow and ice fields. And there is no need to explain how severe and treacherous the Arctic climate is. And aircraft are being developed which take all this into account.

The fleet of these aircraft has been replenished lately with new types of airplanes and helicopters. Thus, An-24T aircraft with "Toros" side-looking radars, which make it possible to obtain a picture of the ice cover in a band 75 kilometers wide regardless of the time of day and the weather, are being utilized for ice reconnaissance. Special aerial photography airplanes--the already tested Il-14FKM and the new An-30--are providing service for the "Severnny Polyus" high-latitude expeditions which are operating in the Central Polar Basin. Until recently, cargo flights for the Soviet Antarctic Expedition were made principally by Il-18D extended-range aircraft. During the 27th CPSU Congress, an Il-76TD heavy transport aircraft with wheeled landing gear made a landing on a snow-and-ice airfield in the Antarctic for the first time. This aircraft was accommodated at airfields of the Soviet Molodezhnaya and Novolazarevskaya Antarctic stations. This flight opened a new page in exploration of the sixth continent.

Short routes in polar regions are being served by series An-2 and Il-14 airplanes and Mi-2, Mi-4 and Mi-10K helicopters fitted for operation under low temperature conditions. An-72 and An-74 transport aircraft now have been built especially for operation in the Far North and the Far East. They are not distinguishable from each other on the exterior. The maximum useful load of these aircraft is 10 tons and their cruising speed is 720 kilometers per hour. The An-72 is a short takeoff and landing aircraft. The unique design of the landing gear struts, together with low-pressure tires, enable it to operate reliably on airfields with soft wet soil and coarse gravel, as well as those covered with ice and snow, including high-elevation airfields.

The An-74 aircraft was especially designed for operation under severe climate conditions. Two powerful and economical turbofan engines have been mounted on the high-wing monoplane. A particular feature of this aircraft is that it can be ready for operation without preheating, even at 40 below. The aircraft is equipped with an on-board self-contained long-range navigation system.

Equipment for hydrological observations has been installed. Workstations have been provided in the cabin for the captain-instructor of ice reconnaissance, a hydrologist, and operators. The design of the aircraft makes it possible to airdrop cargoes on drift ice and on ships.

One of the versions of the Il-18 aircraft--the Il-24N--is being used for instrument and visual reconnaissance of the ice cover in the Arctic and Antarctic basins in the interests of safeguarding maritime transport navigation. The aircraft has been equipped with a special electronic system consisting of side-looking radar and two single units with memory instrumentation and an on-board digital computer. They conduct visual scanning of ice conditions through transparent hemispherical blisters. The lighting equipment has been improved. Additional gear has been installed in the aircraft which facilitates its operation in high latitudes--short- and long-range radio navigation systems and a Doppler velocity sensor.

The giant Mi-26 helicopter was shown at the USSR VDNKh [Exhibition of Achievements of the National Economy] in 1985, and it is now being given an operational "running-in" already in Tyumen Oblast. This helicopter can carry large-size cargoes and equipment of up to 20 tons. It is equipped with two D-136 shaft-turbine engines of 11,500 horsepower each. The Mi-26 successfully combines high load capacity, high cruising speed (255 kilometers per hour) and long range (800 kilometers when the main tanks are full). The aircraft is equipped with a hoisting and loading system consisting of two electric hoists and a jib. Cargo of up to 5 tons can be loaded with it and shifted along the length of the cabin. A cargo ramp mounted on board, which opens and closes with the aid of hydraulic cylinders, speeds up loading and unloading operations. It can be moved out to the level of a motor vehicle body and fixed in that position. So that a vehicle with large-size cargoes can come up to the ramp unobstructed, the tail bumper retracts into the tail boom. The aft section of the helicopter may be raised a little on the shock struts of the main landing gear for this purpose.

The Mi-26 has an efficient electrothermal blade deicing system. A new navigation equipment complex and an automatic control system have been installed in it. An on-board television system enables the crew to observe loading or unloading without leaving the cabin. The maximum takeoff mass of the helicopter is 56 tons, and it has a crew of four.

The extensive experience in building domestic helicopters with coaxial rotors has been realized in the new Ka-32 helicopter, developed for conditions in the Far North and the Arctic. Composition materials have been used in the design of the main rotor and several elements of the airframe. Because of the specific features of the coaxial rotor and the system of rotors itself, the helicopter can be parked on the decks of ships with the blades folded into a single cluster along the fuselage toward the tail. Equipment and navigation aids, including modern computers which make it possible to conduct a flight in accordance with a program preset beforehand and an automatic landing approach, have been installed in the aircraft. When necessary, the pilot can intervene in the control and correct the flight. The helicopter was developed in two versions--transport and ship-based. In the transport version, the aircraft can carry cargo in the cargo bay or suspended externally if it has large dimensions, as well as service drilling rigs both on shelves or afloat. The ship-based version will be used for ice reconnaissance, in leading icebreakers and accompanying ship convoys, in ship unloading and rescue missions at sea.

The helicopter's powerplant consists of two TVZ-117 single-shaft turbojet engines of 2,205 horsepower each. They are started by an auxiliary powerplant which has been built in, which makes the helicopter independent of a ground-based power source. The main powerplant is equipped with a system which automatically maintains the rotation rate of the main rotor and synchronizes the engines' operation. Its power is completely sufficient to provide for horizontal flight if one of the engines fails. Such a power reserve, combined with a reliable deicing system for the main rotor blades, windows and air intakes, makes the flight safe even under heavy icing conditions.

The modern instrumentation and navigation equipment, autopilot and approach control radar on board--all this makes it possible to fly under instrument flight conditions at any time of day. In the near future, Ka-32 helicopters will be provided with equipment making it possible to measure the thickness of the ice and assess the ice condition automatically during the flight.

The An-28 airplane, which is already being flown on Aeroflot routes, will be produced in a polar version for conducting visual and instrumental reconnaissance for fish and marine animals, ice reconnaissance, and providing support for expedition operations by landing on snow-covered ice in the Arctic Basin.

Maintenance of aircraft in polar aviation has to be mentioned in particular. Because this equipment is operated when the temperature is minus 40 degrees Celsius, as a rule, considerable attention is devoted to ensuring that hydraulic and fuel systems are leakproof, since rubber seals become deformed and partially lose their properties under such conditions. Technical personnel have to inspect these very systems more frequently than usual to detect unsealing of the various main lines and tighten couplings. They check

the condition of the fuel more often under polar conditions, since crystals can form in the fuel tanks in low temperatures. In order to prevent water or snow from getting directly in, they ensure that the different types of vents, engine nozzles, exhaust units, and the like are sealed.

In maintaining aircraft in polar aviation, the MP-Sever [heavy-duty, north] engine preheaters and the A-2001 and UPM-1 units to prevent aircraft icing are being used extensively at base airfields. The UPM-1 unit, which is used more often, was developed on the basis of the ZIL-130G truck, on which a small jet engine was installed after completing its service life. They coat the leading edges of the wings and tailplane (or the helicopter rotor blades) with the special "Arktika" liquid to prevent icing before flight.

Ground-based mechanized facilities which will be utilized for the operation of aviation equipment in the Far North will be developed by specialists of the sector's design institutes and civil aviation plants in the 12th Five-Year Plan. Series production of small electric heaters for the engines of An-2 and An-24 aircraft has been planned already in 1986. The low-powered heaters are able to maintain a favorable temperature for the engines under polar region conditions when aircraft are parked for a long period. As a result, aircraft engines' service life is maintained, aviation fuel is economized, and the time to prepare for a mission is reduced.

A powerful prime mover for the Il-76T and An-124 ("Ruslan") aircraft operating on snow-covered airfields will be developed in 1987.

In the Far North, the Arctic and Antarctic, the need to conduct flights under instrument weather conditions will require further improvement in navigation equipment and the air traffic control system.

The work to develop aircraft for polar conditions will proceed in three basic directions: flight performance will be improved, serviceability will be improved, and measures which contribute to increased flight safety will be introduced. In developing helicopters designed for operation in the high latitudes, the requirements for ability to land on water and buoyancy and the evacuation and rescue of passengers and crew will be taken into account. The noise and vibration levels will also be reduced.

The 27th CPSU Congress has outlined a specific program for accelerating scientific and technical progress. The principal task now is to begin carrying out the measures set forth by the party without delay. The many thousands of members of the civil aviation collective have taken an active part in work to ensure the most expeditious introduction and efficient utilization of the latest aircraft and ground-based equipment intended for operation under polar conditions.

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## MOTOR VEHICLES AND HIGHWAYS

### SUPREME SOVIET COMMISSION ON NEED FOR HIGHWAY CONSTRUCTION

Moscow SOVETIY NARODNYKH DEPUTATOV in Russian No 8, Aug 86 pp 28-32

[Article by Yu. Khrenov: "Do We Pay for Bad Roads for a Long Time?: Notes from a Meeting of the Permanent Transport and Communications Commissions of the Chambers of the USSR Supreme Soviet"]

[Text] During the 1982 harvesting season, 39,000 trucks from various departments were brought to the kolkhozes and sovkhozes of Belgorod and Tambov Oblasts. This was in addition to the transport available at the farms. But the rains came, and two of every three vehicles were unable to operate--they were stuck in the mire of country roads. According to the most conservative estimates, more than 150,000 vehicle-days were lost and the shipment of nearly 2 million tons of freight was held up because of the poor access roads. It is clear how this affected the cities' supply: part of the crop was ruined on the whole because of the late delivery to places where it is consumed, stored and processed. The trucks that were stuck on the dirt roads had to be towed by tractors. Excess fuel and lubricants were used, and equipment was broken and put out of service. It is clear that as the production cost of agricultural output increased, the transport costs in it reached 40 percent and more.

This is the way that we are paying for bad roads. And this is far from all the charge. The countryside does not have good roads that are reliable in all seasons--and its social reconstruction is impeded over and over again. People are leaving such places; everything here, it is usually said, "is losing its promise." On the other hand, if a ribbon of asphalt is stretched out from the city to the remote countryside, it is as if the remote area is reborn and this ribbon is literally stretching it upward. Everyone certainly has noted that in areas where there are good roads and the villages are particularly attractive, they have a special stature and they look at the world brightly and with dignity; you won't find any abandoned huts with windows boarded up here.

Rural roads are important. The discussion held at a meeting of the commissions named in the Kremlin on the work of Yaroslavl Oblast soviets to develop roads in the rural area is important. What did the discussion reveal?

V. GORULEV, chairman of the Yaroslavl Oblispolkom, delivered a report. Let us say frankly that he did not deserve applause. The general opinion of the meeting's participants on the report was expressed by DEPUTY S. LUKYANCHENKO, chief of the Black Sea Shipping Company:

"We are in no way satisfied with work by the ispolkom of the oblast soviet and the soviets of Yaroslavl Oblast to develop the rural road network. It is obvious from the report that rural roads in the Yaroslavl region are still neglected."

Clearly the work has been judged by its results. And here are these results. In all, there are 3,530 kilometers of general-purpose hard roads in Yaroslavl Oblast, of which 1,282 kilometers are asphalt concrete. This is not enough, of course: more than one-third of the kolkhoz and sovkhos farms have no reliable road link with rayon centers.

The situation is even worse with the development of intra-farm roads. According to Gosagroprom [State Agroindustrial Committee] estimates, there should be 4,680 kilometers of hard roads--an average of 14 kilometers per farm. At present there are just 300 kilometers, that is, less than 1 kilometer per farm.

It is clear that when there are not enough roads, they must be built. They are building them. But how? As an example, this is already the seventh year that a 14-kilometer access road has been under construction in the "Yasnaya Polyana" Sovkhos in Bolsheselskiy Rayon. And a road 1.8 kilometers long has been under construction as much in the "Melenkovskiy" Sovkhos in Yaroslavskiy Rayon. In the last five-year plan, they planned to link 33 kolkhoz and sovkhos farms with rayon centers by reliable roads, but they linked only 28...

DEPUTY I. PROKOPYEV, first secretary of the Chuvash Obkom:

"It is seen from all this that the soviets of Yaroslavl Oblast and their executive and administrative organs are not displaying the necessary urgency in solving the problems of improving roads in the rural area, and are not increasing the responsibility of the managers of roadbuilding organizations for unconditional fulfillment of established roadbuilding plans and for using the resources available to expand the road network. It is abnormal that road problems have not once been examined at rayon soviet sessions over the past 5 years in the majority of rayons, and that rayispolkoms essentially have not heard the accounts of roadbuilding organization managers at their meetings. The soviets are not making full use of the right granted to them by legislation to enlist the services of kolkhozes, sovkhos, enterprises and organizations of different sectors in road operations, either. In 1981, 1983 and 1984, the oblast as a whole did not ensure the fulfillment of plans for real participation by farms and enterprises in the construction and repair of local motor roads. In the past five-year plan, their direct participation in roadbuilding work continued to be among the lowest of the autonomous republics and oblasts of the Nonchernozem Zone of the RSFSR.

Yes, the soviets are not doing the full amount of work. As an example, they are not devoting proper attention to the use of available local resources in road construction. With the critical demand for crushed rock and gravel for the roads in the oblast, the quarries in operation are being expanded slowly and practically no new deposits of stone materials are being put into use. Opportunities to make use of the waste products of the oil refining industry, which continue to accumulate in large quantities in settling ponds and pollute the environment, are being realized poorly. Hundreds of thousands of tons of so-called "sludge" have accumulated over many years at just the Petroleum Refinery imeni D. I. Mendeleyev. Processing it could fully provide the oblast's asphalt plants, which just because of the lack of it are not operating at full capacity now, with raw material. But for the past 5 years, just 30,000 tons of the binder have been extracted from these waste products--a drop in the sea!

Departmental disconnectedness also is to blame for the situation which has developed in road construction. It is difficult to calculate how many hundreds, and perhaps even thousands, of kilometers of rural roads in just Yaroslavl Oblast alone which often do not exist because of the lack of departmental coordination. They could be built. And... they have not been built. Let us say that road construction, including in the countryside, is severely limited because of the shortage of such materials as crushed rock and gravel. Does the oblast have them? They have them, and even in considerable quantity. But the quarries where they produce these materials belong to different ministries--the Ministry of Transport Construction, Ministry of Construction, Ministry of Railways [Minput], Ministry of Power and Electrification... And this means that it's as though the oblast had nothing here. If something comes its way from here, it is more on the order of "a patron's assistance" than by right. The ministries named transport hundreds of thousands of tons of these materials every year to other regions, but the oblast frequently imports them for its own needs from the same places!"

And this is not just a Yaroslavl problem (as with all the problems discussed at the meeting, incidentally). DEPUTY V. STEPANOV, first secretary of the Karelian Obkom:

"Our situation in Karelia is also similar in many respects. Departments have seized the region's natural resources and are making use of them, far from taking local interests into account."

The solution?

V. STEPANOV: A procedure should be established in which a single one is involved in quarrying the stone--the USSR Ministry of the Construction Materials Industry, for example--and the others in this case, including local organizations without fail, of course, obtain what is required in accordance with an appropriate order.

Bureaucracy... Its primary principle is: it would be convenient for us, but the others... Well, the deputies said, couldn't that same Ministry of Petroleum Refining and Petrochemical Industry, which not only has a powerful production base, but a scientific base as well, really turn what is now

becoming waste which is poisoning the environment into profits of benefit to everyone? It could, of course, if it did not proceed from its own narrow interests and those of the state as well. Even the weak effort to process sludge which is under way at the Refinery imeni D. I. Mendeleyev is not to its credit. Scientists in Yaroslavl VUZes thought of this and put it into operation, and the powerful union ministry remained on the side. And it is now turning to the problem reluctantly. One of the sector's executives, Deputy Minister V. Popov, attended the meeting. He heard the criticism. In responding to it, he tried to justify the inactivity with "objective reasons." In the commissions' decision, the deputies had to make an appropriate entry for the ministry.

Lack of coordination in the republic's Ministry of Highways and Ministry of Motor Transport also are holding back road construction in rural areas: transport workers, who consider the road workers' projects as "someone else's," do not agree to provide shipments for them in the quantities necessary. But how can something be built from nothing!

The Ministry of Construction, Road, and Municipal Machine Building makes its "contribution" as well--it is not in a hurry to provide road organizations with sufficient modern equipment. Much of what they receive from it is either "the day before yesterday" or is more suitable for agricultural work than for building highways.

The deputies spoke heatedly and implacably of all the shortcomings in rural road construction. And this discussion was not limited to just Yaroslavl Oblast alone, either.

"And our rural road situation outside Odessa is no better, unfortunately," noted S. LUKYANCHENKO bitterly. "In many places during the bad road season, it is not only impossible to drive through, but walk through as well. They often take children to school on tractors, and also run a powerful tractor to deliver several milk cans to the receiving point..."

"I am a driver," said Deputy V. TIMOCHKIN from Perm Oblast, "and I have traveled throughout the oblast, I may say. The rural road picture is identical in most cases. And it is not pleasant. I have not been at any meetings in the election district where people have not raised the question of roads. This is a sore subject and it is not simple to resolve, but it is necessary to resolve it--common interests demand this."

The commissions approved detailed recommendations to the ispolkom of the Yaroslavl Oblast Soviet, the soviets of the oblast, and the ministries and departments concerned. The thrust of them is that the situation which has developed in rural road construction must be corrected urgently. The oblispolkom should improve supervision of the construction, operation and maintenance of rural roads and develop and implement measures aimed at seeing that all central farms of kolkhozes and sovkhoses acquire reliable links with rayon centers in this five-year plan.

It was recommended that the RSFSR Ministry of Highways and the RSFSR State Agroindustrial Committee reinforce the responsibility of planning organizations within their jurisdiction for the quality of planning estimates they draft for road construction and develop and introduce a comprehensive quality control system for road construction.

The USSR Gosplan, the USSR State Agroindustrial Committee and the USSR Ministry of Construction, Road, and Municipal Machine Building should see that roadbuilding organizations are better provided with material resources, equipment, and spare parts for it.

The ispolkom of the Yaroslavl Oblast Soviet, ministries and departments should inform the commissions about the measures adopted by 1 August 1987.

\* \* \*

A letter was on my desk when I returned to the editorial office from the commissions' meeting. It was from the village of Okhmatkov in Mlinovskiy Rayon, in the Ukraine's Rovno Oblast. And the letter also concerned roads, or more accurately, the result of the lack of them. "Our village is beautiful," writes Petr Vladimirovich Zasyuk, deputy of the rural soviet. "We all love it, and it's nice to live and work here. But here's the trouble--in spring and fall one cannot reach here by walking or driving, although it is just 600 meters from the asphalt to the last hut..."

The deputy goes on to tell about the problems endured by people because of the lack of a road. In the season of bad roads, the children cannot get to school in the normal way and milkmaids cannot get to the farm. This is one of the reasons why many persons have begun leaving Okhmatkov lately. "I have two sons," writes P. Zasyuk. "The older one is already in school, and the younger one soon will be. My wife works on a farm. And I'm wondering if we shouldn't leave for a place where there is no swamp like this..." The deputy asks the editorial staff to help get a road for the village.

The editorial staff does not build roads, of course. We hope that local authorities will examine and resolve this problem. But P. V. Zasyuk's letter again forces us to reflect that the problem which the permanent commissions of the chambers of the USSR Supreme Soviet discussed at their meeting is not just "a Yaroslavl one." It is an important one, a very important one for the entire country. Consequently, the recommendations made by the commissions concern literally all soviets.

Rural roads must be built and well maintained. This is not simple. It is expensive. But bad roads are more expensive.

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## MOTOR VEHICLES AND HIGHWAYS

### SOVKHOZ DIRECTOR ON IMPROVING MOTOR VEHICLE HARVEST SUPPORT

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 24 Jun 86 p 1

[Article by A. Kutakov, director of the Sovkhoz imeni Vilgelm Pik: "We Make Do With Our Own Transportation"]

[Text] - Osakarovskiy Rayon, Karaganda Oblast - Every year before mass shipments of the harvest the managers of the farms are bothered by the same problem: the shortage of automotive transportation. They turn to the RAPO, the party raykom and the rayispolkom requesting that more motor vehicles be allotted. In turn, the rayon organizations make a similar request to the party obkom and oblispolkom. And there may not have been a single case when the farms were not allotted vehicles that were taken from automotive transportation organizations, industrial enterprises and construction sites. This is very costly both to the owners of the motor vehicles and to the sovkhozes and kolkhozes. The enterprises cannot keep up with the shipments of their cargoes and on the farms the transportation expenditures are added to the production cost of the products.

Of course not every farm can do without assistance from outside, but they can reduce the quantity of automotive transportation that is brought in. At one time we did not refrain from accepting surplus trucks, but then we took stock of our own capabilities and decided to rely more on our own means of transportation, even though we have a large volume of shipments of agriculture products. For example, last year we shipped from the fields and then to the elevators an overall total of more than 38,000 tons of grain. At the same time we delivered to the wintering places of the cattle more than 45,000 tons of silage, 12,170 tons of haylage and 7,571 tons of hay. The average distance of the transportation amounted to 10-12 kilometers. Moreover, we shipped livestock and milk to the processing enterprises with our own transportation and delivered fuel, lubricants and construction materials to the sovkhoz.

We have a relatively small automotive transportation fleet--63 cargo vehicles, including 36 milk trucks, water trucks and motor vehicles adapted for transporting people. Additionally, 12 vehicles on the sovkhoz are used on the threshing floors. Almost as many are used for transporting coal, construction materials and other cargo. During the period of harvesting the crops we can assign only 5-6 vehicles for delivering the grain. But nonetheless last year we managed to transport 59,000 tons of products to the places of storage and

processing using our own forces. The remaining 30,000 tons were delivered by 40 vehicles that were brought in from the outside. Delivering this quantity of cargo costs considerably more than that which we delivered through our own forces.

How did we manage to reduce the quantity of automotive transportation brought in from outside with increasing volumes of agricultural products being shipped? We began to use tractors--the K-700, K-701, T-4 and MTZ--more as means of transportation. This appeared as a possibility after we reequipped for hay pickup the SK-4 combine which had been written off. We also used them for procuring haylage. Last year we used wheeled tractors with 45-cubic-meter carts for shipping about 20,000 tons of hay and chopped hay.

The reequipped combines and 4-meter reapers are also used on the sovkhos for harvesting corn. Tractors with carts are also used for shipping most of the silage mass. Last year we transported two-thirds of all of the mowed corn. For transportation we always use 56 wheeled tractors.

We think that every farm has possibilities of reducing the number of vehicles brought in from outside. And this is in the interests, for example of the feed procurement workers themselves. When they were changed over to the collective contract they learned to keep track of their money, and therefore they are interested in paying as little as possible.

In our opinion, it is possible to use one's own means of transportation more effectively as a result of improvement of technological processes in the field. Fewer trucks are required with the combination trailer and portion methods of shipping the harvest. One can utilize carts more extensively by attaching them to trucks that are used for technological purposes. The turnover of transportation is accelerated and its productivity is increased by complete mechanization of loading work, improvement of the quality of the roads, and straightening of the approach roads. The availability of machine operating personnel is of no small significance. For there are still many cases in which during the harvest time, because of a shortage of combine operators, truck drivers and tractor drivers are transferred to harvesting machines.

It is necessary to take an economical approach to the problem of transportation for moving the harvest. Only then will it be possible to remove its urgency.

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## MOTOR VEHICLES AND HIGHWAYS

### AvtovAZ ASSOCIATION EXPERIMENTS WITH ECONOMIC MANAGEMENT

Moscow SOTSIALISTICHESKIY TRUD in Russian No 7, Jul 86 pp 16-24

[Article by A. Yasinskiy, director of the VAZ [Volga Motor Vehicle Works] for economics and planning, under the rubric "VAZ: Acceleration, Intensification, Competitiveness": "New Tasks and New Methods of Management"; initial paragraph printed in large italics in source; other italicized passages enclosed in slantlines; passages rendered in all capital letters printed in boldface in source]

[Text] The VAZ turns out excellent motor vehicles, which are widely known here and in a number of other countries. But this is not enough today. Your vehicles are inferior to the best foreign vehicles of the same type. Moreover, in developing new vehicle models, you must look more to the future. Each time the plant introduces the next model, we hear: the new vehicle will be on a level with the best models in the world. Well, I want to ask you this question: why is the VAZ satisfied with new vehicles that are just on a level with the best models in the world? Why don't you set yourselves a task on a little higher scale--to be a kind of arbiter of motor vehicle style in the world? This is within the capability of such a skilled collective. (From Comrade M. S. Gorbachev's speech at a meeting with workers in the city of Tolyatti)

The party's 27th congress spoke of the necessity of strengthening the role of economic methods of management and reinforcing cost accounting. Associations and enterprises have been set the task of ensuring that the economic machinery orients labor collectives to the maximum possible extent toward accelerating the rates of growth and increasing the efficiency of production, introducing new equipment and continuously improving technology, and turning out products of high quality. At the same time, enterprises--after the example of the VAZ and the Sumy NPO [scientific production association]--must be given the opportunity themselves to



earn the capital necessary for expansion and the technical renovation of production. In a word, this refers to self-financing, self-repayment, and genuine cost accounting.

Today we tell about the work experience of the AvtoVAZ Production Association under the new management conditions.

It is well known that increasing production output is the most reliable means of improving all the technical and economic indicators in the work of any enterprise. The higher the rates of production, the easier it is to achieve high indicators in reducing production cost and increasing profit, and depending on this, to achieve increased economic incentive and social development of the collective. At the same time, the enterprise receives a unique "income" from the part of the personnel force and expenditures on production that are constant.

The complexity of this problem at the VAZ lies in the fact that, after having rapidly developed the planned capacities (1974), the association is operating at a "frozen" level in motor vehicle production. The capacities for turning them out are being fully utilized. And an increase in production volumes, labor productivity and profit was planned for us in the 10th and 11th Five-Year Plans, incidentally. Consequently, we have been working essentially for 10 years under conditions of intensification.

With an extremely small increase in motor vehicle output, we have to raise the average annual rate of increase in production volume by 1.3 times as much and profit by more than four times as much in the current five-year plan. And this is under conditions in which the number of new and modernized vehicles is being doubled or tripled. This involves important production preparation, and consequently, additional expenditures, complication of the work and other problems which are inevitable when new equipment is developed, which has a detrimental effect on production cost.

For this reason, more efficient ways must be sought to carry out the tasks which have been set. Increasing the quality of our production is an important resource for increasing profit and economic incentive funds. As an example, the cost of rectifying the defects in "Zhiguli" and "Niva" vehicles which were discovered by purchasers amounted to more than 10 million rubles in 1984. This is nearly one-quarter of the association's economic incentive fund.

The resources for increasing production and product quality are not confined to this, of course; they are to be found everywhere, at every work place. The conference in the CPSU Central Committee on questions of accelerating scientific and technical progress noted that product quality should be a subject not only of occupational pride, but national pride as well. These words apply most of all to the VAZ, whose vehicles are exported to dozens of countries, including highly developed ones.

This problem is also a purely applied and practical one for us. For, by being one of the country's largest exporters of machine building output (if not the largest), the VAZ bears a great responsibility to the national economy for receipt of foreign exchange, and this is a key function for it. One percent

of the country's national income, the country's retail commodity turnover, and the state's budget revenues falls to the share of our association. But after all, one of the basic objectives of the economic experiment is precisely to substantially increase the volume of deliveries for export. We must turn out vehicles at the highest level in the world for this.

Introducing new equipment, updating production, and reorganizing technology, which require thousands of new machine tools and automated lines, materials, semimanufactures and units, are resulting in hundreds and thousands of changes in subcontracting relationships at the VAZ and associated plants. And because our production is large-scale, the development of new base models and their modernization is multisectorial in nature, and is proceeding with difficulty and badly.

What are the specific TASKS that we have to perform under conditions of the experiment?

We have already stated that renovation of basic production--motor vehicles--in the 12th Five-Year Plan will be tripled in comparison with the most intensive previous five-year plan. This year, we have to develop a new model--the five-door VAZ-2109 with a 1.3-liter engine--to fulfill the "norm," and modernize the 1.5-liter VAZ-21083, as well as the VAZ-21086 and VAZ-21096 (for countries with left-hand traffic). In 1987, the VAZ-21083 "deluxe" vehicles, with a 1.5-liter engine, digital electronic ignition and improved interior, will begin coming off the assembly line, and the VAZ-21093 "deluxe" and others will be turned out in 1988. Production of a vehicle fundamentally new for the association, the two-seat VAZ-1111 minicar with a 30-horsepower two-cylinder engine, which uses 3.2 liters of fuel per 100 kilometers, should begin in 1988. An experimental-industrial batch of the front-wheel drive VAZ-2110, which seats three, will be turned out in 1990. The first batch of vehicles with a diesel engine will come out the same year.

In the current five-year plan, it is planned to update all vehicle models, and in particular, to turn out the VAZ-2107, with a five-speed transmission and a contactless ignition system. In the VAZ-2121, a more powerful engine will be installed, the universal-joint drive will be strengthened, and the body and interior will be changed. The technical level and esthetics of the vehicle will be enhanced because of this, its weight will be reduced on the average by 3 percent, and fuel consumption will be reduced by 8-10 percent. We hope to increase their export.

Such a task is inconceivable unless substantial changes in technology are made. This refers to FLEXIBLE PRODUCTION SYSTEMS first of all. Inflexible automatic systems were used when output of essentially two models was established in accordance with the original plan for the enterprise. This proved itself and was repaid by high productivity. But when the task is to modernize one of the vehicle models every year and produce a new model every 5 years, batch production is reduced in the process and inflexible automatic systems become expensive and inefficient.

AUTOMATED CONTROL SYSTEMS should be developed further. The performance of new tasks, such as the design of large dies and drawing dies, body strength

analysis, automation of drafting operations, and organization of automated workstations for the designer (ARM) is being planned with the use of a SAPR [computer aided design system]. The extent of automation of design operations will be brought up to 20 percent. This will enable us to shorten design periods by one-half to one-third as much, to improve the quality of design work, to reduce the periods and volume of finishing operations, and so forth.

DEVELOPMENT OF OUR OWN MACHINE TOOL MANUFACTURING BASE is a very important technical problem. Our machine tool builders have manufactured for themselves and shipped to other enterprises by now 2,100 units of advanced engineering equipment valued at 73 million rubles. These directions may be distinguished in the large-scale plan for machine tool manufacture in the association: welding equipment (automatic welding lines, welding jigs and machinery), metal-cutting equipment (automatic lines, machine tool units), special complexes for vehicle manufacture (painting, galvanizing, assembly), manipulators and welding robots, control systems for special equipment and assembly lines, and welding cycle regulators. It is planned to develop capacities to produce advanced engineering equipment valued at up to 100 million rubles annually in the 12th Five-Year Plan. The increased volume of machine tool manufacturing will amount to 175-180 percent. For the needs of the association and other enterprises, 930 welding robots, 6,500 manipulators and 75 automatic lines will be turned out. This is an important technical basis for accelerating the technical retooling and updating of production.

TECHNICAL RE-EQUIPMENT OF ALL TOOL SHOPS is envisaged to fully meet the requirement for high-quality tools and accessories without increasing production areas and the work force; the output of these items will increase by 40 percent as much because of this.

We must be fundamentally reorganized now. We cannot expect financial resources from anywhere, and we must depend on our own means to carry out the tasks that have been set.

The results planned for developing the association in the 12th Five-Year Plan are cited below (see table).

Indicators	11th Five-Year Plan	12th Five-Year Plan
Increase in labor productivity, in points	11.9	18.9
Reduction of production cost, in points	+1.01	-3.05
Decrease in workstations, in units	2,500	3,000
Number of workers released (absolute)	+8,300	-1,300
Profit, in percent	100	118.6
Payments to the budget from profit (after deduction of budget allocations), in percent	100	172.6

As we see, an appreciable increase is expected in the association's work efficiency, which will result from acceleration of scientific and technical development. However, the result of the collective's efforts is not confined

to this. The principal result of these efforts will have an effect in the 13th Five-Year Plan, when economic gain will be obtained from development of the new model of the VAZ-2110 vehicle.

The conditions of the economic experiment contribute to a large extent to acceleration of scientific and technical progress. AvtoVAZ' readiness to carry it out was determined by the following basic factors.

First. The association has accumulated instructive experience in conducting large-scale economic experiments. The concept of parallel planning, construction, the conduct of startup and adjustment work, and development of production output was adopted as far back as the establishment of the Volga Motor Vehicle Works. We reduced the period for beginning vehicle production at least by 3 years. This made it possible to recover all capital investment in construction of the plant by the time it was turned over for operation. After that the association conducted another important experiment to develop planning indicators for vehicle production and the level of production cost and labor productivity. A special system of planning and economic incentive was worked out for this. At the same time, the firm system for vehicle repair and technical maintenance was developed. It is also well known that namely the VAZ initiated introduction of the brigade form of organization and labor incentive, which has been universally disseminated.

Second. Being one of the country's largest suppliers of machine building output for export, the AvtoVAZ is obliged to bring both its products and the technology for their manufacture up to date. But it has more opportunities for this, since the foreign exchange from export taken into the country gives it the ethical right to imported equipment and licenses.

Third. By the end of the five-year plan, the equipment installed in accordance with the first plan will have been in service for 20 years. Replacing it all at once means stopping production for a long period of time. Not replacing it means incurring vast expenditures for repair and turning out production of low quality. Consequently, we must intensively and continuously renovate. There is no alternative here. This strategic task is being carried out under conditions of new management methods aimed not only at accelerating scientific and technical progress, but at intensifying the principles of cost accounting as well.

The basic tasks which must be performed in the course of the experiment may be stated briefly in the following manner. It is necessary first of all to substantially accelerate the development of new equipment, which for our association means primarily passenger cars. The task is stated specifically this way: reduce the time for developing a new base model from 8 to 5 years, or by more than one-third as much. Then it will become possible to put a new base model in production every five-year plan. One production line [tekhnologicheskaya nitka] out of three is replaced simultaneously with this. In that way the second task is resolved--the entire inventory of equipment is updated every 15 years, which will become the optimum period of time under conditions of mass vehicle production.

Replacement of one base model every 5 years means that with three production lines, each one of them will be in production for 15 years. For a vehicle this period is clearly unacceptable, since it will become obsolete both technically and esthetically during this time. In order to prevent this, modernization of one of the models being produced is called for every year. Carrying out this third task will make it possible to continuously maintain production at the level of the best models in the world and to ensure its competitiveness. And this is the way to achieve one of the basic objectives of the experiment--to increase and maintain a high level of exported production for freely converted [konventiruyemaya] foreign exchange.

A WELL-ADJUSTED ECONOMIC MECHANISM is needed in order to better utilize the association's powerful production organization. Elements of it have been provided for in the conditions of the economic experiment. A guaranteed fund of financial resources for the long term for systematic updating of output and technology and a guaranteed fund of foreign exchange resources for purchasing special highly productive equipment abroad have been established in the association.

When we say "guaranteed," we by no means wish to say that establishment of the funds indicated has already been predetermined. On the contrary, /we must earn these funds, and the amount of them depends on the total profit and the volume of export deliveries./ We call them guaranteed because they are established for the long term in accordance with firm long-term standards, and depend only on efforts by the collective of the association and where needed, they are provided with material resources, the maximum contracting operations, and the right to purchase machinery and equipment abroad. We also call the funds guaranteed because we hope that they are inviolable by financial or higher management organs.

The fund of financial resources for scientific and technical renovation of production and capital goods has retained the old name with new content. It is /the production development fund/. The sources for its formation also are traditional, though there is something new as well. The first thing is that the total sum of depreciation deductions are entered in the fund for renovation. The second feature is the standard for profit withholding taxes in the production development fund in the amount of 15 percent, which is stable for 5 years.

The association decides independently what to use the production development fund for. Regardless of the sources for its formation, the assets of this fund are spent in accordance with the estimate set aside for financing expenditures to expand and remodel buildings and facilities, to organize production of new and modernized models of vehicles, and to conduct startup and adjustment and other operations. The fact that assets from the fund are also directed toward scientific research and experimental design work, acquisition of licenses, and compensation for increased expenses to produce new output during the period for its development is new. Interest for the use of bank credit is paid and an increase in the allowance for our working capital is financed from this same fund. This fund in the association thus has become a multipurpose financial lever for production development.

The complex nature of the production development fund makes it more "convertible," and hence more flexible, more practical, and more maneuverable. In certain stages of development of any enterprise, especially a large one such as the AvtoVAZ, the immediate necessity is to finance design operations, and in other stages, to finance adjustment operations, and so forth. The pattern for expenditure of the production development fund takes shape in conformity with the stages of technical development. Conditions for the experiment stipulate that this fund should be provided for equipment, contract operations and other resources in order of priority.

A specific feature of the VAZ is that special highly productive equipment is extensively used in production. It is economically more profitable to import it from developed capitalist states and CEMA member countries. A large /foreign exchange fund/, formed on cost accounting principles (in contrast to many other enterprises) on the basis of a percentage of foreign exchange receipts for the supply of output and services rendered for export, is being established in the association for this purpose. The foreign exchange fund can provide for up to 40 percent of the association's entire requirement for equipment and a significant proportion of associated enterprises' requirement for it, inasmuch as we have the right to spend up to 25 percent of foreign exchange allocations for these purposes. The essence of cost accounting principles is that in the association, this fund is the only source for financing import purchases on a very large scale, whereas the overwhelming majority of machine building enterprises carry out technical re-equipment with the use of imported equipment by means of centralized foreign exchange assets allocated from the state budget.

Having acquired reliable financial and economic resources for the long term, engineering and technical and planning subunits of the association have found confidence in realizing their ideas and efforts. At least 2 years of formal work has been saved in "forcing out" allocations and resources for developing new equipment and retooling production. Just the one fact that guaranteed funds for technical development have been established has made it possible for the association's engineering corps to state that it is decreasing the periods for developing and perfecting new base models from 8 to 5 years, by more than one-third as much. It is clear to every engineer and economist that this promises vast national economic gain and will make it possible to advance domestic motor vehicle manufacturing to the front ranks in the world.

The production development fund with foreign exchange assets forms the basis for technical development of the association. But that is not enough. It is necessary to increase work efficiency in all other directions: to improve the organization of production and labor, to reduce unproductive expenditures and losses of every type, to improve utilization of material and power resources, and to provide for a constant decrease in the production cost of output and increased profit.

The /fund for social and cultural measures and housing construction/ and the /material incentive fund/ to provide personal incentive for employees serve as a powerful lever of collective material incentive in the association's achievement of these goals. These FUNDS ARE NEW IN CONTENT, or else they are formed with and now possess much more mobilizing force. The point is that

expenditures have been included in the social and cultural fund which previously were financed from the budget (nursery school upkeep) or under the system of budgetary apportionment of profit by the USSR Ministry of Finance (financial losses in housing and municipal services and maintenance of facilities for social and cultural purposes--rest facilities, Young Pioneer camps, buildings for sports, and so forth). Under conditions of the experiment, the budget allocations for production capital investments and current expenditures for maintenance of social facilities have been abolished in the association. This is the most important indication and principle in building up financial resources for production and social development--the principle of "earning." Our association must itself earn all the means, without exception, for the collective's social development. However, this principle has not been completely realized in the experiment. The point is that the capital stipulated for housing construction in the standards for forming the fund is only in the amount which involves the use of our own resources. And this amounts to only about 12 percent of the current housing construction plan. Consequently, the budgetary method of acquiring capital for social development is being retained. The social and cultural fund is being formed in accordance with the standard of 19.5 percent of the total profit and is provided for material resources and the maximum contract operations first of all.

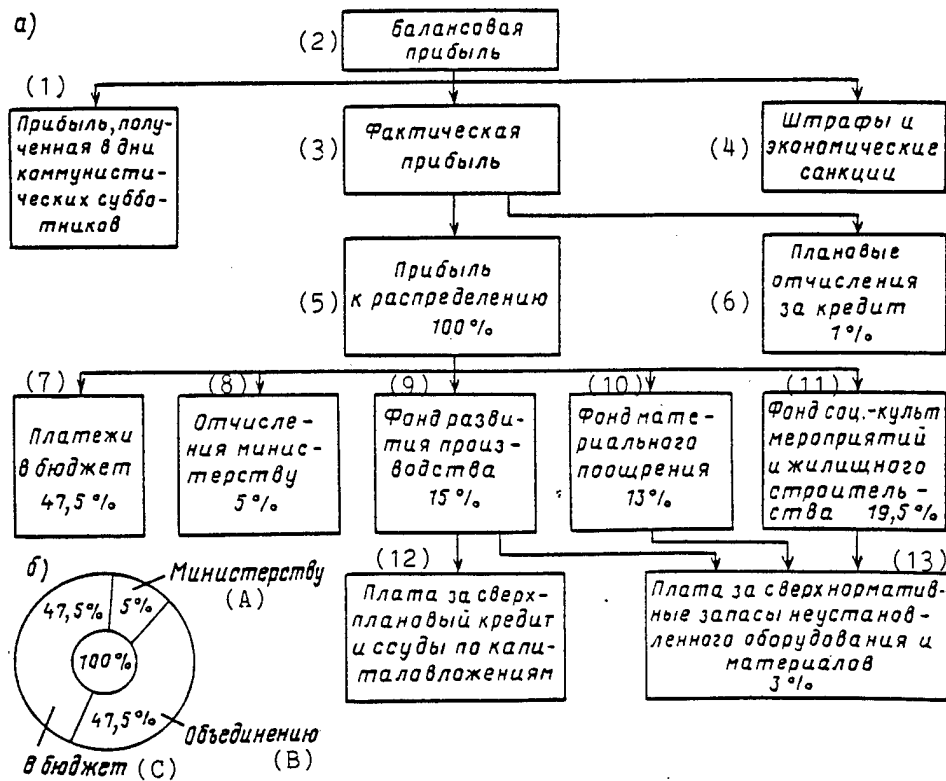
The material incentive fund is formed in accordance with standards from a single indicator--profit. The right to determine the amounts and procedure for payment of bonuses and rewards through this fund has been granted to the administration in coordination with the trade union committee. The association has been authorized to turn part of the material incentive fund assets over to associated enterprises and contract organizations to provide incentive for deliveries of high-grade raw material, materials and complete sets of items in time, as well as for speeding up completion of the enterprise's technical re-equipment while production is under way.

The new management methods are shown most dramatically in the procedure for distributing the profit. How does its distribution differ under conditions of the experiment?

First. A standardized method, and constant standards for the entire five-year plan, differentiated by years.

Second. Instead of 25 to 35 different items for the financial plan under ordinary conditions, there are seven: payments to the budget from profit acquired on communist subbotniks, interest for bank credit for the basic work, payments to the budget in accordance with the standard, and deductions for the sectorial ministry and the association's three funds.

Third. The absence of a charge for the basic production funds. As an economic penalty, a charge has been retained for above-norm uncredited commodity stocks and uninstalled equipment in the amount of 3 percent, which is paid into the budget from the material incentive funds.



- Key:
1. Profit obtained on communist subbotniks
  2. Profit balance
  3. Actual profit
  4. Fines and economic penalties
  5. Profit for distribution, 100%
  6. Planned deductions for credit, 1%
  7. Payments to budget, 47.5%
  8. Deductions for the ministry, 5%
  9. Production development fund, 15%
  10. Material incentive fund, 13%
  11. Fund for social and cultural measures and housing construction, 19.5%
  12. Charge for above-plan credit and capital investment loans
  13. Charge for above-norm stocks of uninstalled equipment, materials, 3%

Small circle graph:

- A. For the ministry
- B. For the association
- C. To the budget



Fourth. At the cost of profit remaining at the association's disposal and subject to payment into the production development fund and social and cultural fund in accordance with standards, we have the right to establish a financial reserve (in the amount of 5 percent of the total of these funds from profit) which is spent in accordance with special instructions for the needs of our enterprises.

THE PRINCIPLES OF PROFIT DISTRIBUTION are very simple and easily understood by every employee, and they are entered well in intraplant cost accounting, especially in the sections on the forms and amounts of economic penalties. After payment of fines and economic penalties, as well as the planned deductions for credit, from the profit balance, 5 percent of the remaining profit is withheld for the Minavtoprom [Ministry of the Automotive Industry], 47.5 percent goes into the budget, and the same amount remains in the association. The profit distribution plan indicated is already close to cost accounting. Only the procedure for forming a wage fund is not written into this scheme. /Under full cost accounting conditions, the wage fund should be a "residual" element/ after settlements with the budget, suppliers, and the credit system and formation of the production development and social and cultural funds. Under conditions of the experiment, the FZP [wage fund] is formed on partial cost accounting bases: as the amount of the wage fund for the base year and an increase in accordance with the standard, calculated in percentages of the base fund for each percent of increase in commodity production.

The new economic mechanism requires further improvement in the organization of labor and production and the provision of incentive to achieve high end results, and we are working continuously on this.

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## MOTOR VEHICLES AND HIGHWAYS

### TESTING OF IMPROVED TYUMEN ATV MODELS

Moscow PRAVDA in Russian 30 Mar 86 p 1

[Article by K. Aksenov, PRAVDA correspondent: "Tyumen--A Reliable Make"]

[Text] Kropotkin - Krasnodar Kray - The "dead season" is what geological prospectors and drillers call the time of bad roads during the spring. To no small degree this is a period when the rates of work decline sharply and people are given the Tyumen marsh vehicles which are produced by Krasnodar workers. The first batch of the new series of vehicles was sent to Siberians recently.

It is not without reason that they call the old riverbed, densely overgrown with reeds, a bad place. Underneath the brown water is a deep layer of icky slime and a few little plants. You look at it and think: Is it really possible to go over this in a motor vehicle? You will drown! But it is precisely here, at the bend, that the managers of the experimental machine building plant has selected as a testing ground for proving the reliability of the marsh vehicle. Their idea was simple: if it cannot get through this floodplain it will not make it on the roadless areas of Siberia.

The tester N. Gladkov invites us to get in and turns on the engine. The powerful vehicle passes smoothly over a decline. The dry reeds burst, spreading a soft fuzz, the sugary ice cracks and breaks, the water seethes and foams, reaching higher and higher toward the cab. Even the "paws" of the caterpillar which are almost a half-meter wide have been concealed in the mud, but the tractor driver is calm.

"We have not left the marshes for 2 months," explains Gladkov. "So far we have not had any serious problems. The vehicle does not worry about the lack of roads...."

Nikolay Georgiyevich came to the plant 10 years ago. Incidentally, at that time the plant did not exist yet. The bays of the modern shops had just sprung up and the machine tools were being installed. And suddenly at the outset of the construction it was decided to sharply change the enterprise's specialization--to arrange for the output of cross-country vehicles here. The kind that would easily pass over the snowdrifts and moss which had previously

been considered to be impassable, that would not be daunted by the freezing Siberian weather, and, finally, would not only move across the marshes, but would also ship in dozens of tons of cargo in one trip.

During the 6 years since the beginning of production the machine builders have sent hundreds of Tyumen marsh vehicles to the northern residents. The immense, almost 15-meter giants which are the color of a ripe rowenberry go over impassable roads, delivering up to 40 tons of cargo. One can see installed on their platforms an excavator or a winch, a tank with heating or welding equipment, a crane or a railroad car for dwelling space. In Surgut, Yugansk and Nizhnevartovsk the enterprise has created its own "reliability sections." Experienced specialists help the machine operators to operate and repair the marsh vehicles, whose output has increased appreciably.

Testing is being completed on a new model. Having left a broad trail, the marsh vehicle is slowly abandoning the testing ground.

"Our machines operate under extreme conditions," says the director of the enterprise, A. Kostarnoy. "Freezing, dirt and water. The durability must be high. Therefore the weak spots revealed during the course of operation of predecessors have been strengthened. The old design of drive axles have been completely replaced."

The creators of the Tyumen have set a task: to earn the Emblem of Quality for the snow and marsh vehicle as early as next year. The battle for durability of each screw, part and component is being waged from the work positions here. They have been certified. Incentive measures are directed toward quality. Do it precisely according to the list and you will receive an additional 40 percent payment. If you fall behind and have slipshod work, you will see no bonus. This has stepped up the search for reserves and eradicated rush work. The brigade of I. Martynenko assembles the marsh vehicles. Five giants that were constructed in tandem are being born right before your eyes. You cannot even find the workers in the sections for the road wheels and for balancing the universal joints. Having prepared a set of parts precisely according to the norm, they have left to perform other operations. There is complete interchangeability!

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## MOTOR VEHICLES AND HIGHWAYS

### SAVR-3 AIR CUSHION ATV TESTING

Moscow IZVESTIYA in Russia 7 Apr 86 p 1

[Article by IZVESTIYA Correspondent A. Sabirov: "On an Air Cushion"]

[Text] - Yoshkar-Ola - "During the spring period of bad weather, the vehicle moves along without looking for a road...without wheels: tests are being conducted on a cross-country vehicle created in the Mary Polytechnical Institute." This is the way IZVESTIYA Correspondent A. Sabirov began his article.

"...Even workers of the republic agricultural experimental station who had seen a great deal were impressed by this unusual sight. Over the spreading land there hovered--actually hovered!--a strange vehicle that looked like a motorboat. Attached in the front was an ordinary seeder whose wheels barely touched the ground, and the yellow grain of the wheat fell from the bunker onto soil over which a tractor could not even pass. The unusual set of equipment slid over the field without leaving tracks either of wheels or of caterpillar tractors."

This is how the specialists wrote about the first "steps" of this vehicle.

I was sitting in the cab next to the head designer, V. Kurdin. He not only creates this equipment, but also tests it himself. He has many difficult routes behind him, including on the harsh peninsula of Yamal. The cross-country vehicle, submitting to the experienced hand, moved confidently, passed over snowdrifts swollen with water, the loose spring ice, the puddles and the mud. Finally it descended to a little stream, and as if nothing had happened slid across a broad patch of clear water in the middle of the ice.

A surprising property of such equipment is the extremely small amount of proportional pressure on the surface, which is incomparable with that created by steel caterpillar tracks or rubber tires. Under the broad bottom of our cross-country vehicle there is air which is held in by a kind of edging around the sides. The air cushion makes it possible even for such a heavy transportation vehicle to hover.

"We began with a simple design on order from industrial hunters of the Caspian area," says the leader of the special design bureau, Candidate of Technical Sciences S. Kirkin. "It turned out to be successful and series production was organized in Astrakhan. The next vehicle was intended for fishermen of Western Siberia. We called it a self-propelled vehicle with air unloading. And now we are manufacturing amphibious vehicles of this series under contract for creative cooperation with the USSR Ministry of Construction for Petroleum and Gas Industry Enterprises. The model being tested is the SAVR-3. The air currents that are created by the ventilator are capable of raising the body over the land. The air propeller, like on an airplane, draws the vehicle forward at a great speed. One fueling is enough to cover up to 500 kilometers. The cross-country vehicle resting on the wind can take 200 passengers on board.

"The amphibian vehicle is intended for watch transportation of people," says Stanislav Fedorovich. "We are convinced that it is especially promising to use it under the conditions of the oil fields of Tyumen. The road network is poorly developed there and the weather is not very good. Buses moving on air cushions could transport the drillers, oil field workers and well repairmen to their jobs promptly and ship urgent cargoes."

Next in line are cargo platforms which are capable of lifting 30 tons each and more.

In the opinion of specialists, many branches need means of transportation that move on air cushions. Thus last year the Mary designers used their amphibian machines for early planting of grain crops. The hovering machine "carried" a seeder in front of it, and behind it on the soil that had not dried out yet there was not a single track. The collective of the Special Design Bureau is again preparing for spring field work. In conjunction with agro-industrial organizations they intend to conduct the threshing of winter crops, the planting of perennial grasses and other operations. In a word, there is more than enough to do.

"We have dreamed of making a vehicle for Tyumen petroleum and gas workers which will not operate on imported fuel," the enthusiasts of the discovery told me.

It is interesting that the main thing is that it is a realistic idea. Is it not time for the interested ministries and departments to open up the road for the future cross-country vehicle?

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